RAW SEQUENCE LISTING   DATE: 12/21/2001
PATENT APPLICATION: US/09/882,694A   TIME: 15:29:01

Input Set : N:\Crf3\RULE60\09882694A.txt
Output Set: N:\CRF3\12212001\I882694A.raw

```
  5 <110> APPLICANT: Duvick, Jon
  7        Maddox, Joyce
  9        Gilliam, Jacob
 11        Folkerts, Otto
 13        Crasta, Oswald R.
 17 <120> TITLE OF INVENTION: Compositions and Methods for Fumonisin
 19        Detoxification
 23 <130> FILE REFERENCE: 5718-111
 25 <140> CURRENT APPLICATION NUMBER: 09/882,694A
 27 <141> CURRENT FILING DATE: 2001-06-15
 30 <150> PRIOR APPLICATION NUMBER: 09/351,224
 32 <151> PRIOR FILING DATE: 1999-07-12
 36 <160> NUMBER OF SEQ ID NOS: 11
 40 <170> SOFTWARE: FastSEQ for Windows Version 4.0
 44 <210> SEQ ID NO: 1
 46 <211> LENGTH: 1691
 48 <212> TYPE: DNA
 50 <213> ORGANISM: Exophiala spinifera
 54 <220> FEATURE:
 56 <221> NAME/KEY: misc_feature
 58 <222> LOCATION: (0)...(0)
 60 <223> OTHER INFORMATION: flavin monooxygenase with intron
 64 <400> SEQUENCE: 1
 66 atgtcggcca ccagcaactc cagaggcgat tgttccgtcg catgcgacgc catcatcgtt   60
 68 ggagccggcc tcagcggcat ctctgctgtg tacaaattgc gaaagctcag actcaacgcc  120
 70 aaaatcttcg agggagcccc cgattttggc ggcgtctggc actggaaccg ctaccctggc  180
 72 gctcgtgttg attcggagac gcccttctac caactgaaca ttcccgaagt atggaaagac  240
 74 tggacctggt cttgccgcta tcctgaccag aaagagttgc tgtcatatgt tcaccactgt  300
 76 gacaagatcc ggggcttgag aaaagacgtc tacttcggag ctgaggtggt tgatgcgcgg  360
 78 tatgccagag atctgggcac ctggactgtc aagacgtcgg ctggccatgt tgcgacggca  420
 80 aagtatctca ttctcgctac ggggttgctc cacaggaagc acactcccgc actccccggc  480
 82 ctcgccgatt tcaacgggaa ggtgattcat tcgagtgcct ggcacgaaga cttcgacgca  540
 84 gagggccaga gagtcgccgt catcggtgcc ggggccacaa gcatccagat tgttcaggag  600
 86 ttggccaaga aggctgacca ggtaaccatg tttatgcgaa ggccgagcta ttgtctgccc  660
 88 atgcggcaac gaacgatgga taggaacgaa cagacagcct ggaaggccta ctaccccacg  720
 90 ctgtttgaag cgagtcgaaa gtctcggatt ggattcccgg tccaggcacc gtcggttggc  780
 92 atctttgaag tcagccccga gcagcgggag gcctatttcg aagagttgtg ggagcgtggg  840
 94 gcctttaatt ttcttgcttg ccagtaccga gaagtcatgg ttgacaaaaa ggccaaccga  900
 96 ctggtctatg acttctgggc caaaaagact cgatctcgta tcgtcaatcc ggcaaagaga  960
 98 gatctcatgg ctcctctgga gccgccgtac tggttcggta ccaagcgctc cccactggag 1020
100 agcgactact acgaaatgct ggacaagccg agcgtcgaaa ttgtgaatct agaacaatcg 1080
102 cccattgtgg ctgttacaaa gacaggtgtg ctcttgagtg acggcagcaa gagggaatgc 1140
104 gacacgatcg tgctggcgac gggtttcgac agtttcactg gctcgtgagt gtgctcgatc 1200
106 atggctccga gtccggacgt ttggctgacc ttgaaagatt gacacatatg ggcttgaaaa 1260
108 acaagcacgg agtggacctg aaggaggtgt ggaaagatgg catatctact tatatgggag 1320
110 tcttctctca tggcttcccc aatgccttct tcgtcgccac ggctcaagcc ccgaccgtcc 1380
112 tttccaacgg cccaacgatc atagaaaccc aagtcgactt gatcgccgat acaattgcaa 1440
```

RAW SEQUENCE LISTING   DATE: 12/21/2001
PATENT APPLICATION: US/09/882,694A   TIME: 15:29:01

  .Input Set : **N:\Crf3\RULE60\09882694A.txt**
   Output Set: **N:\CRF3\12212001\I882694A.raw**

```
114 agttggaggc cgagcacgcc acgtccgttg aggcgacgaa atcagcacaa gaggcatggt 1500
116 cgattatgat tgccaagatg aacgagcaca ctctgttccc cttgacggat tcgtggtgga 1560
118 ctggaggcaa catccctggg aaagcaacac gtgctttaac cttcataggc gggattgctc 1620
120 tctatgagca gatctgtcaa gagaaggtgg ccaattggga tgggtttgat gtgcttcatg 1680
122 ctccctgcta a                                                    1691
126 <210> SEQ ID NO: 2
128 <211> LENGTH: 1638
130 <212> TYPE: DNA
132 <213> ORGANISM: Exophiala spinifera
136 <220> FEATURE:
138 <221> NAME/KEY: misc_feature
140 <222> LOCATION: (0)...(0)
142 <223> OTHER INFORMATION: flavin monooxygenase, fully spliced
146 <400> SEQUENCE: 2
148 atgtcggcca ccagcaactc cagaggcgat tgttccgtcg catgcgacgc catcatcgtt 60
150 ggagccggcc tcagcggcat ctctgctgtg tacaaattgc gaaagctcag actcaacgcc 120
152 aaaatcttcg agggagcccc cgattttggc ggcgtctggc actggaaccg ctaccctggc 180
154 gctcgtgttg attcggagac gcccttctac caactgaaca ttcccgaagt atggaaagac 240
156 tggacctggt cttgccgcta tcctgaccag aaagagttgc tgtcatatgt tcaccactgt 300
158 gacaagatcc ggggcttgag aaaagacgtc tacttcggag ctgaggtggt tgatgcgcgg 360
160 tatgccagag atctgggcac ctggactgtc aagacgtcgg ctggccatgt tgcgacggca 420
162 aagtatctca ttctcgctac ggggttgctc cacaggaagc acactcccgc actccccggc 480
164 ctcgccgatt tcaacgggaa ggtgattcat tcgagtgcct ggcacgaaga cttcgacgca 540
166 gagggccaga gagtcgccgt catcggtgcc ggggccacaa gcatccagat tgttcaggag 600
168 ttggccaaga aggctgacca ggtaaccatg tttatgcgaa ggccgagcta ttgtctgccc 660
170 atgcggcaac gaacgatgga taggaacgaa cagacagcct ggaaggccta ctaccccacg 720
172 ctgtttgaag cgagtcgaaa gtctcggatt ggattcccgg tccaggcacc gtcggttggc 780
174 atctttgaag tcagccccga gcagcgggag gcctatttcg aagagttgtg ggagcgtggg 840
176 gcctttaatt ttcttgcttg ccagtaccga gaagtcatgg ttgacaaaaa ggccaaccga 900
178 ctggtctatg acttctgggc caaaaagact cgatctcgta tcgtcaatcc ggcaaagaga 960
180 gatctcatgg ctcctctgga gccgccgtac tggttcggta ccaagcgctc cccactggag 1020
182 agcgactact acgaaatgct ggacaagccg agcgtcgaaa ttgtgaatct agaacaatcg 1080
184 cccattgtgg ctgttacaaa gacaggtgtg ctcttgagtg acggcagcaa gagggaatgc 1140
186 gacacgatcg tgctggcgac gggtttcgac agtttcactg gctcattgac acatatgggc 1200
188 ttgaaaaaca agcacggagt ggacctgaag gaggtgtgga agatggcat atctacttat 1260
190 atgggagtct tctctcatgg cttccccaat gccttcttcg tcgccacggc tcaagccccg 1320
192 accgtccttt ccaacggccc aacgatcata gaaacccaag tcgacttgat cgccgataca 1380
194 attgcaaagt tggaggccga gcacgccacg tccgttgagg cgacgaaatc agcacaagag 1440
196 gcatggtcga ttatgattgc caagatgaac gagcacactc tgttcccctt gacggattcg 1500
198 tggtggactg gaggcaacat ccctgggaaa gcaacacgtg ctttaacctt cataggcggg 1560
200 attgctctct atgagcagat ctgtcaagag aaggtggcca attgggatgg gtttgatgtg 1620
202 cttcatgctc cctgctaa                                              1638
206 <210> SEQ ID NO: 3
208 <211> LENGTH: 545
210 <212> TYPE: PRT
212 <213> ORGANISM: Exophiala spinifera
216 <400> SEQUENCE: 3
218 Met Ser Ala Thr Ser Asn Ser Arg Gly Asp Cys Ser Val Ala Cys Asp
220 1               5                   10                  15
```

RAW SEQUENCE LISTING   DATE: 12/21/2001
PATENT APPLICATION: US/09/882,694A   TIME: 15:29:01

Input Set : N:\Crf3\RULE60\09882694A.txt
Output Set: N:\CRF3\12212001\I882694A.raw

```
222 Ala Ile Ile Val Gly Ala Gly Leu Ser Gly Ile Ser Ala Val Tyr Lys
224             20              25              30
226 Leu Arg Lys Leu Arg Leu Asn Ala Lys Ile Phe Glu Gly Ala Pro Asp
228         35              40              45
230 Phe Gly Gly Val Trp His Trp Asn Arg Tyr Pro Gly Ala Arg Val Asp
232     50              55              60
234 Ser Glu Thr Pro Phe Tyr Gln Leu Asn Ile Pro Glu Val Trp Lys Asp
236 65              70              75              80
238 Trp Thr Trp Ser Cys Arg Tyr Pro Asp Gln Lys Glu Leu Leu Ser Tyr
240             85              90              95
242 Val His His Cys Asp Lys Ile Arg Gly Leu Arg Lys Asp Val Tyr Phe
244             100             105             110
246 Gly Ala Glu Val Val Asp Ala Arg Tyr Ala Arg Asp Leu Gly Thr Trp
248     115             120             125
250 Thr Val Lys Thr Ser Ala Gly His Val Ala Thr Ala Lys Tyr Leu Ile
252     130             135             140
254 Leu Ala Thr Gly Leu Leu His Arg Lys His Thr Pro Ala Leu Pro Gly
256 145             150             155             160
258 Leu Ala Asp Phe Asn Gly Lys Val Ile His Ser Ser Ala Trp His Glu
260             165             170             175
262 Asp Phe Asp Ala Glu Gly Gln Arg Val Ala Val Ile Gly Ala Gly Ala
264             180             185             190
266 Thr Ser Ile Gln Ile Val Gln Glu Leu Ala Lys Lys Ala Asp Gln Val
268     195             200             205
270 Thr Met Phe Met Arg Arg Pro Ser Tyr Cys Leu Pro Met Arg Gln Arg
272     210             215             220
274 Thr Met Asp Arg Asn Glu Gln Thr Ala Trp Lys Ala Tyr Tyr Pro Thr
276 225             230             235             240
278 Leu Phe Glu Ala Ser Arg Lys Ser Arg Ile Gly Phe Pro Val Gln Ala
280             245             250             255
282 Pro Ser Val Gly Ile Phe Glu Val Ser Pro Glu Gln Arg Glu Ala Tyr
284             260             265             270
286 Phe Glu Glu Leu Trp Glu Arg Gly Ala Phe Asn Phe Leu Ala Cys Gln
288     275             280             285
290 Tyr Arg Glu Val Met Val Asp Lys Lys Ala Asn Arg Leu Val Tyr Asp
292     290             295             300
294 Phe Trp Ala Lys Lys Thr Arg Ser Arg Ile Val Asn Pro Ala Lys Arg
296 305             310             315             320
298 Asp Leu Met Ala Pro Leu Glu Pro Pro Tyr Trp Phe Gly Thr Lys Arg
300             325             330             335
302 Ser Pro Leu Glu Ser Asp Tyr Tyr Glu Met Leu Asp Lys Pro Ser Val
304             340             345             350
306 Glu Ile Val Asn Leu Glu Gln Ser Pro Ile Val Ala Val Thr Lys Thr
308     355             360             365
310 Gly Val Leu Leu Ser Asp Gly Ser Lys Arg Glu Cys Asp Thr Ile Val
312     370             375             380
314 Leu Ala Thr Gly Phe Asp Ser Phe Thr Gly Ser Leu Thr His Met Gly
316 385             390             395             400
318 Leu Lys Asn Lys His Gly Val Asp Leu Lys Glu Val Trp Lys Asp Gly
```

RAW SEQUENCE LISTING   DATE: 12/21/2001
PATENT APPLICATION: US/09/882,694A   TIME: 15:29:01

Input Set : N:\Crf3\RULE60\09882694A.txt
Output Set: N:\CRF3\12212001\I882694A.raw

```
320              405              410              415
322 Ile Ser Thr Tyr Met Gly Val Phe Ser His Gly Phe Pro Asn Ala Phe
324          420              425              430
326 Phe Val Ala Thr Ala Gln Ala Pro Thr Val Leu Ser Asn Gly Pro Thr
328          435              440              445
330 Ile Ile Glu Thr Gln Val Asp Leu Ile Ala Asp Thr Ile Ala Lys Leu
332      450              455              460
334 Glu Ala Glu His Ala Thr Ser Val Glu Ala Thr Lys Ser Ala Gln Glu
336 465              470              475              480
338 Ala Trp Ser Ile Met Ile Ala Lys Met Asn Glu His Thr Leu Phe Pro
340          485              490              495
342 Leu Thr Asp Ser Trp Trp Thr Gly Gly Asn Ile Pro Gly Lys Ala Thr
344          500              505              510
346 Arg Ala Leu Thr Phe Ile Gly Gly Ile Ala Leu Tyr Glu Gln Ile Cys
348      515              520              525
350 Gln Glu Lys Val Ala Asn Trp Asp Gly Phe Asp Val Leu His Ala Pro
352      530              535              540
354 Cys
356 545
362 <210> SEQ ID NO: 4
364 <211> LENGTH: 1464
366 <212> TYPE: DNA
368 <213> ORGANISM: Exophiala spinifera
372 <220> FEATURE:
374 <221> NAME/KEY: misc_feature
376 <222> LOCATION: (0)...(0)
378 <223> OTHER INFORMATION: aldehyde dehydrogenase, fully spliced cDNA
382 <400> SEQUENCE: 4
384 atggttcttt cgcctgacga atacaagagt gaactcttca tcaacaatga attcgtctcc 60
386 tccaaggggt ccgagagatt aacgctcacg aacccgtggg acgaatccac cgttgccact 120
388 gatgttcacg tggccaacgc ggccgatgtc gacagtgcag tagccgcttc ggtgcaggcg 180
390 gtcaaaaagg gcccatggaa gaagttcaca ggtgcacaac gcgcggcgtg catgcttaag 240
392 ttcgcggacc tcgccgagaa gaacgccgag aagctcgctc gtctggagtc gctgcccacc 300
394 ggtagaccgg tgtcgatgat cactcatttc gacattccaa acatggtctc cgtgtttcgc 360
396 tactatgcag gctgggccga caagatcgcc ggaaagacct ttcccgagga caacggcaag 420
398 ccgaattggc gttacgagcc gatgggggtg tgtgctggta ttgccagctg gaacgcgact 480
400 tttctttacg tcggctggaa gatagccccc gccctcgccg ccggctgctc cttcatcttc 540
402 aaagcctcgg agaaatcccc gctgggcgtt ctgggcctcg ctcctctctt cgcagaagcc 600
404 ggattccctc ctggagtcgt gcagttcctc actggagcac gagtgacggg tgaagcattg 660
406 gcgtcgcaca tggacattgc gaagatcagc ttcacaagat ctgtcggcgg tggccgcgcc 720
408 gtcaagcaag caacactcaa gtccaacatg aagcgcgtca ctctagaact gggggaaaag 780
410 ccaaccatcg tcttcaacga agctcctctc gaacggcagt cggggggaatc ggcaaaggat 840
412 ttctcaaaat tcgggcaaat ttgggtcccc ccctcctgtt tgctagtgca atggggaaat 900
414 ttagcggaga aattccatgg agtccgtcat ggctcatttg gaggctgtca gagatggctt 960
416 ggccagaacc cattggaacc caagaggacg catggtccct cgtcgacaa gtcccagtac 1020
418 gacagagtct tgggtaacat tgacgttggc aaggataccg cgcagctcct cactggcgtt 1080
420 ggtagaaagg cgacaaggg attcgcgatt gaaccgacga tatttgtcaa tcccaaacca 1140
422 ggcagcaaaa tttggtttga ggagatcttt ggccccgtct tgtccattaa gacgttcaag 1200
424 acggaagaag aggccattga gattgccaat gacacgactt atgggctagc ctcggtcatt 1260
```

RAW SEQUENCE LISTING   DATE: 12/21/2001
PATENT APPLICATION: US/09/882,694A   TIME: 15:29:01

. Input Set : N:\Crf3\RULE60\09882694A.txt
  Output Set: N:\CRF3\12212001\I882694A.raw

```
426 tataccaaat ctctcaacag gggtctccgt gtctcgtcgg cgctcgagac cggtggcgtc 1320
428 tcgatcaact tcccctttat ccccgagaca caaactccgt ttggcggcat gaaacaatcg 1380
430 ggctcaggca gagagctagg cgaagaaggg ctcaaggcgt acttggagcc caagaccatt 1440
432 aatatccacg tcaacataga gtga                                      1464
436 <210> SEQ ID NO: 5
438 <211> LENGTH: 487
440 <212> TYPE: PRT
442 <213> ORGANISM: Exophiala spinifera
446 <400> SEQUENCE: 5
448 Met Val Leu Ser Pro Asp Glu Tyr Lys Ser Glu Leu Phe Ile Asn Asn
450 1               5                   10                  15
452 Glu Phe Val Ser Ser Lys Gly Ser Glu Arg Leu Thr Leu Thr Asn Pro
454             20                  25                  30
456 Trp Asp Glu Ser Thr Val Ala Thr Asp Val His Val Ala Asn Ala Ala
458         35                  40                  45
460 Asp Val Asp Ser Ala Val Ala Ala Ser Val Gln Ala Val Lys Lys Gly
462     50                  55                  60
464 Pro Trp Lys Lys Phe Thr Gly Ala Gln Arg Ala Ala Cys Met Leu Lys
466 65                  70                  75                  80
468 Phe Ala Asp Leu Ala Glu Lys Asn Ala Glu Lys Leu Ala Arg Leu Glu
470             85                  90                  95
472 Ser Leu Pro Thr Gly Arg Pro Val Ser Met Ile Thr His Phe Asp Ile
474             100                 105                 110
476 Pro Asn Met Val Ser Val Phe Arg Tyr Tyr Ala Gly Trp Ala Asp Lys
478         115                 120                 125
480 Ile Ala Gly Lys Thr Phe Pro Glu Asp Asn Gly Lys Pro Asn Trp Arg
482     130                 135                 140
484 Tyr Glu Pro Met Gly Val Cys Ala Gly Ile Ala Ser Trp Asn Ala Thr
486 145                 150                 155                 160
488 Phe Leu Tyr Val Gly Trp Lys Ile Ala Pro Ala Leu Ala Ala Gly Cys
490             165                 170                 175
492 Ser Phe Ile Phe Lys Ala Ser Glu Lys Ser Pro Leu Gly Val Leu Gly
494             180                 185                 190
496 Leu Ala Pro Leu Phe Ala Glu Ala Gly Phe Pro Pro Gly Val Val Gln
498         195                 200                 205
500 Phe Leu Thr Gly Ala Arg Val Thr Gly Glu Ala Leu Ala Ser His Met
502     210                 215                 220
504 Asp Ile Ala Lys Ile Ser Phe Thr Arg Ser Val Gly Gly Gly Arg Ala
506 225                 230                 235                 240
508 Val Lys Gln Ala Thr Leu Lys Ser Asn Met Lys Arg Val Thr Leu Glu
510             245                 250                 255
512 Leu Gly Glu Lys Pro Thr Ile Val Phe Asn Glu Ala Pro Leu Glu Arg
514             260                 265                 270
516 Gln Ser Gly Glu Ser Ala Lys Asp Phe Ser Lys Phe Gly Gln Ile Trp
518         275                 280                 285
520 Val Pro Pro Ser Cys Leu Leu Val Gln Trp Gly Asn Leu Ala Glu Lys
522     290                 295                 300
524 Phe His Gly Val Arg His Gly Ser Phe Gly Gly Cys Gln Arg Trp Leu
526 305                 310                 315                 320
```

VERIFICATION SUMMARY
PATENT APPLICATION: **US/09/882,694A**

DATE: 12/21/2001
TIME: 15:29:02

· Input Set : **N:\Crf3\RULE60\09882694A.txt**
Output Set: **N:\CRF3\12212001\I882694A.raw**

L:1254 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:11